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The effect of gallic acid on the structure and stability human serum albumin

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ABSTRACT

The stability and structure of human serum albumin (HSA) with Gallic acid as an endogenous plant polyphenol have been investigated by of fluorescence, UV−VIS and circular dichroism (CD) spectroscopy. The melting point (T_m) of protein and $\Delta G^{O}_{(298K)}$ as two thermodynamic parameters obtained from thermal denaturation of the HSA with and without the presence of Gallic acid. The magnitudes obtained 332.5 and 329.2 K for T_m, and 97.4 and 95.4 kJ mol^{-1} for $\Delta G^{O}_{(298K)}$ for the sole HSA and its incubation with gallic acid, respectively. In the protein chemical denaturation the magnitudes of $\Delta G^{O}_{(H2O)}$ and C_m for sole HSA and its treatment by gallic acid obtained: $\Delta G^{O}_{(H2O)}$ = 12.5 and 9 kJ mol^{-1}; Cm = 0.22 and 0.17M, respectively. The stern-volmer analysis of fluorescence quenching spectra of HSA with different concentrations of gallic acid a static quenching mechanism have been revealed and the thermodynamic parameters indicates that the hydrophobic interactions played a major role in destabilizing of the HSA-Gallic acid complex. According to above mentioned thermodynamic parameters and structural assessment of HSA with fluorescence and CD, the interaction of gallic acid induced protein instability.

Key words: HAS; Gallic Acid; UV-Visible; Fluorescence; Circular dichroism Thermodynamic parameters